Evaluation and Characterization of Biosurfactants Produced by Microorganisms Isolated from Brazilian Oils

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Surface-active agents or surfactants are amphiphilic molecules that comprise both hydrophilic and hydrophobic moieties, allowing the reduction of the surface and interfacial tensions, as well as the formation of oil in water or water in oil emulsions. Due to their interesting properties, surfactants are widely used by petroleum industries to reduce the capillary forces that retain the oil inside the reservoir. However, since chemical surfactants present some limitations related to environmental issues and restrictive laws, the biosurfactants constitute a reliable alternative due to their lower toxicity, higher biodegradability and effectiveness at extreme temperature, salinity and pH conditions. In this work, different biosurfactant-producing microorganisms under reservoir conditions were isolated from Brazilian oils. Biosurfactant production was evaluated by measuring surface tensions, interfacial oil-water tensions and emulsifi cation activities. Among the isolated microorganisms, two Pseudomonas and three *Bacillus* strains were able to grow and produce extracellular biosurfactants at 40ºC. Furthermore, the biosurfactants were characterized using different spectroscopic techniques, namely FTIR, 1H NMR, ESI/MS and MS/MS. Structural characterization of these molecules is important to understand their surface-active properties, as well as the formation of molecular aggregates. Biosurfactants produced by *Pseudomonas* and *Bacillus* strains were found to be rhamnolipids and surfactins, respectively. The results obtained show that it is important to characterize the biosurfactants in order to optimize their application in bioremediation with crude oil, or in microbial enhanced oil recovery processes.